

Space and Missile Systems Center



GPS Control Segment

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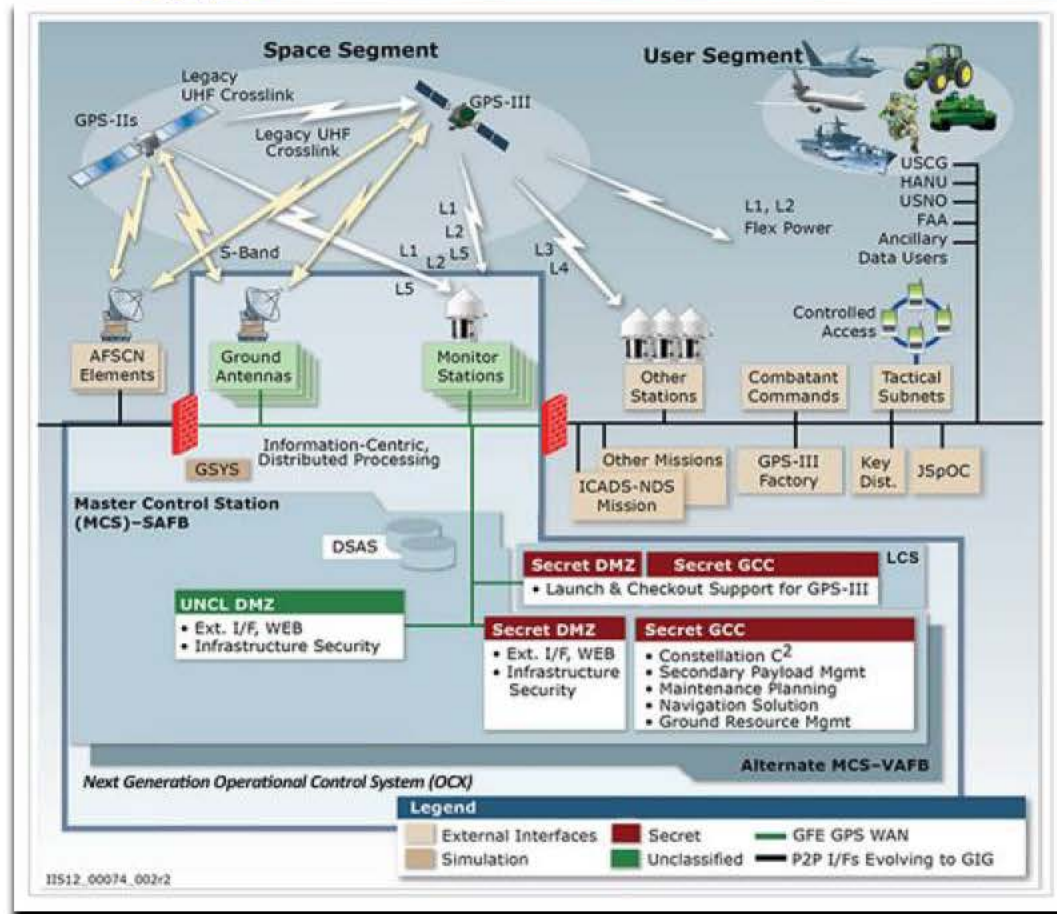
Agenda

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- Next Generation Operational Control System (OCX)
- Contingency Operations

OCX Overview

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- Master/Alternate Control Stations
 - Launch and Checkout System (LCS)
 - Launch and Checkout of GPS IIIs
 - Command & Control (C2) for GPS IIIs in launch / checkout
 - Mission Planning & Scheduling
 - Mission Situational Awareness
 - Constellation & Satellite C2
 - Position, Navigation, and Timing
 - Integrity & Continuity Assurance
- Global Monitoring Station Network
 - 17 globally dispersed sites
 - Monitor quality of broadcast signals and provide input to navigation solution
- Legacy Ground Antennas (LGAs)
 - 4 globally dispersed sites
 - Support data links and signals between the ground and space vehicles
- GPS System Simulator (GSYS)
 - Test driver and anomaly resolution

Acronyms

AFSCN: Air Force Satellite Control Network
 DMZ: De-militarized Zone
 DSAS: Data Storage and Analysis System
 FAA: Federal Aviation Administration
 GCC: GPS Control Center

GFE: Government Furnished Equipment
 GIG: Global Information Grid
 GPS: Global Positioning System
 HANU: High Accuracy Navigation User
 I/F: Interface

ICADS: Integration & Correlation Display System
 MCS: Master Control Station
 Mgmt: Management
 NDS: Nuclear Detection System
 P2P: Point-to-point

SAFB: Schriever Air Force Base
 UHF: Ultra-High Frequency
 USCG: U.S. Coast Guard
 VAFB: Vandenberg Air Force Base
 WAN: Wide-area Network



Block 0 Accomplishment/Status

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- ✓ Block 0 (Launch & Checkout System, LCS) Baseline Integrated, Jun 2014
- ✓ LCS Launch Exercise 4, Oct 2014
- ✓ LCS Configuration Item Qualification Test Procedures (126)
First Dry Run, Dec 2014
- ✓ LCS Consent to Ship, Apr 2015
- ☐ Schriever AFB Equipment Installed, May 2015
- ☐ LCS Configuration Item Qualification Test, Jul 2015
- ☐ Final LCS Hardware/Software Sell-off, Nov 2015
- ☐ LCS Site Acceptance Test, Mar 2016



Block 1 Accomplishments/Status

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- ✓ Block 1 Strategic Pause, Dec 2013
 - Root cause and corrective action identification
 - Over-Target-Baseline foundations
- ✓ Iteration 1.6 Segment Design Walkthrough, Jan 2015
 - Requirements flow-down established for all configuration Items
- ✓ Segment/Element Engineering Freeze Review, Jan 2015
 - 13-month effort to re-baseline Block 1 systems engineering
- ☐ Iteration 1.6 Preliminary Design Walkthrough, May 2015
 - Nearing completion, leads to detailed design activities
- ☐ Iteration 1.6 Critical Design Review, Jul 2015
 - Culmination of detailed design leads to code and unit test activities
- ☐ Iteration 1.7 Segment Design Walkthrough, Nov 2015
 - Establishes requirements flow-down for all configuration Items



Recent Program Activities

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- Rebaselined Program:
 - Over Target Baseline (OTB), Jul 2014
 - AF Service Cost Position (SCP), Nov 2014
 - Block 0 (LCS) acceptance now May 2016
 - Block 1 (with core M-Code) Ready for Transition to Operations (RTO) in Jul 2019
- AT&L Deep Dive held with Mr Kendall, Feb 2015
 - Air Force and Raytheon detailed cost, schedule and performance assessments
 - Established Cost/Schedule Tripwires against SCP baseline
 - Implement GPS III Contingency Operations



Why Contingency Operations?

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- GPS III SV01 needed operational by Sep 2019
- GPS III healthy operations dependent on delivery of OCX Block 1
 - Current control system cannot fly the GPS III
- OCX schedule puts constellation sustainment at risk
 - Jul 2019 projected OCX RTO



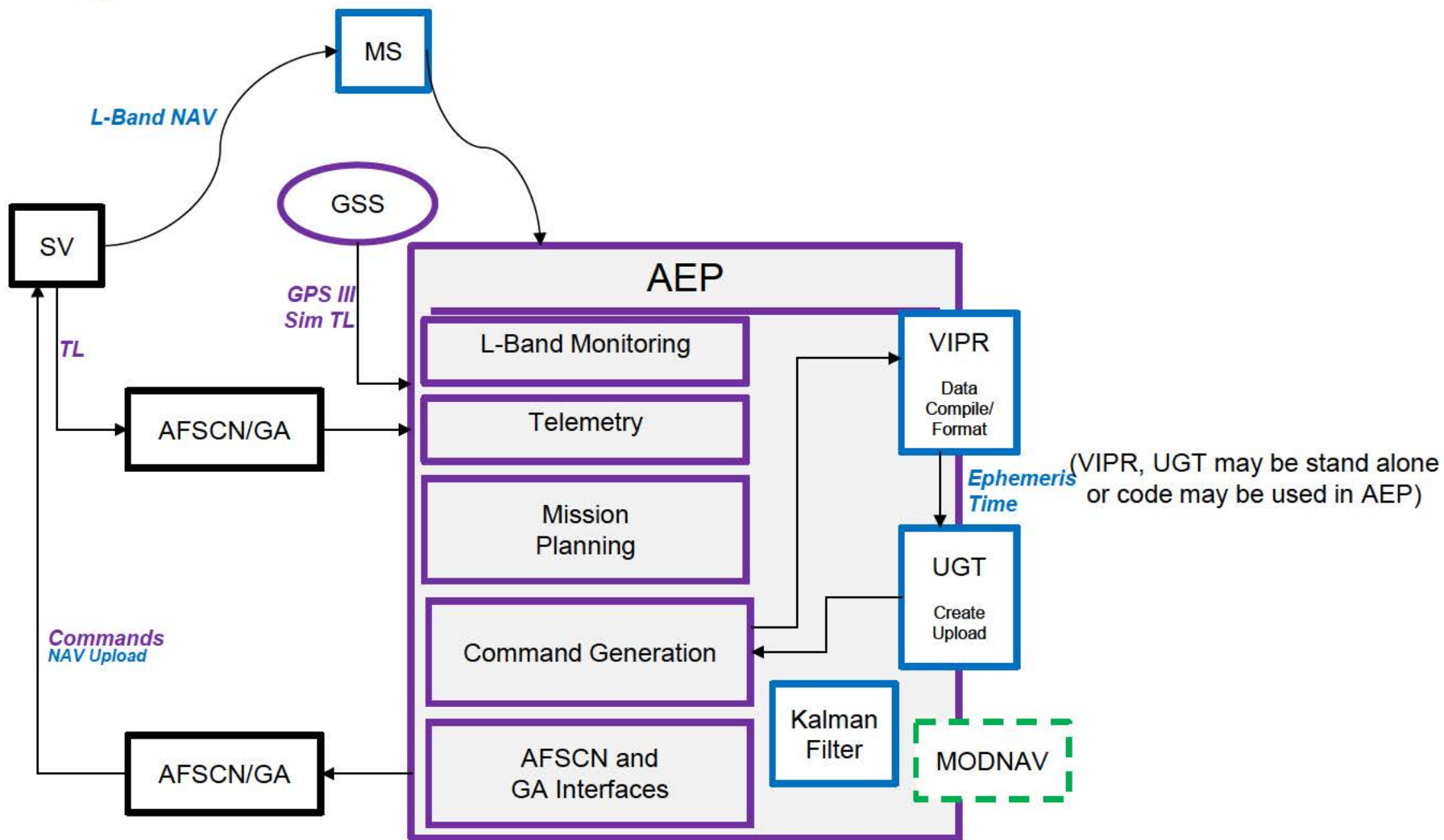
What is Contingency Operations?

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- Provides GPS III SV command and control
- NAV capability equivalent to GPS IIF (legacy and modern signals)
 - No L1C or GPS III enhanced message types
 - No modern signal monitoring until OCX Block 1
- Includes the Nuclear Detonation Detection System (NDS)
- Requires delivery of OCX Block 0 for launch

Contingency Ops Architecture (Notional)

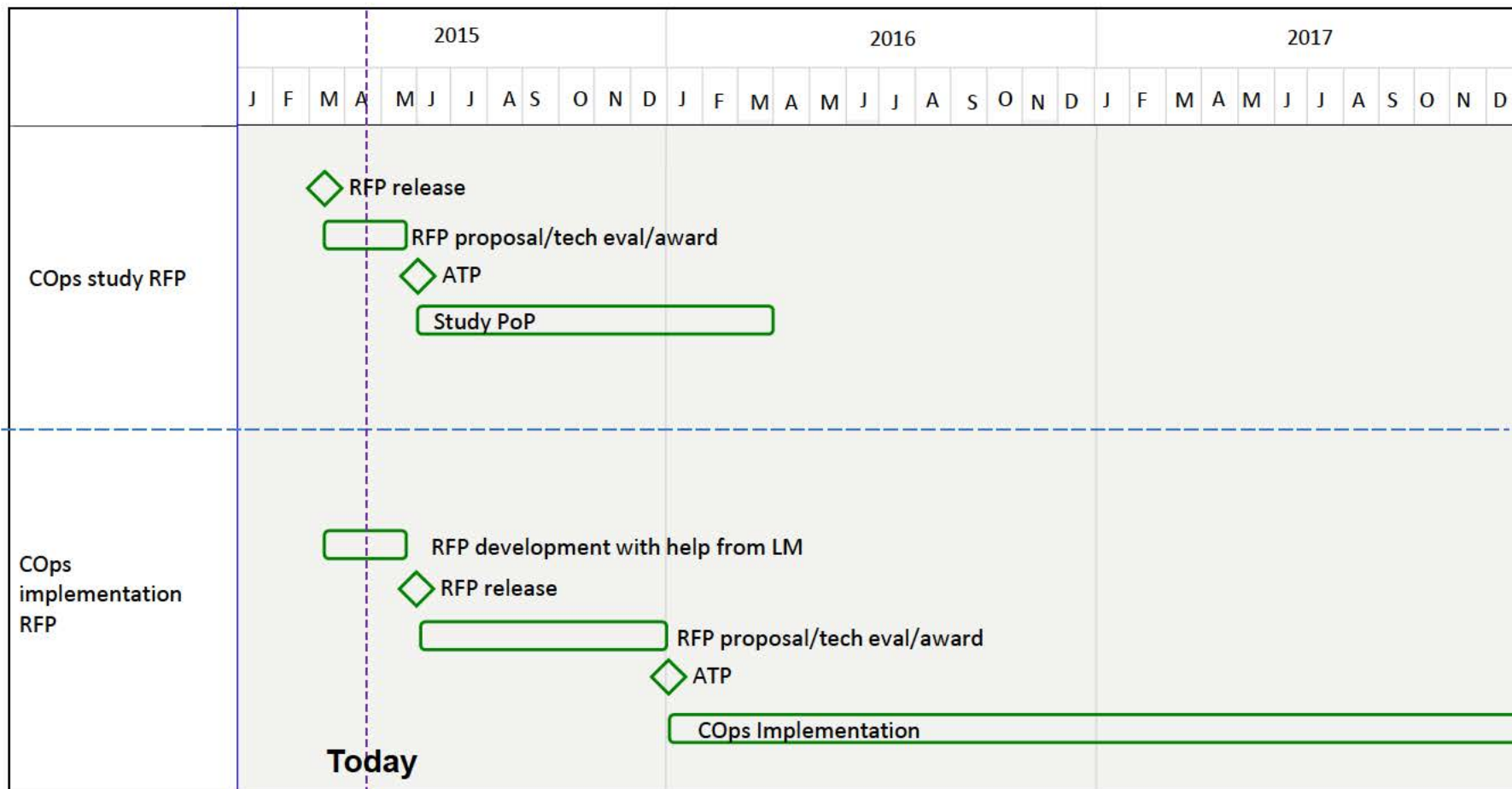
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Contingency Ops Timeline

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Contingency Ops Status & Way Ahead

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- ✓ 5 Feb – Air Force decision to implement
- ✓ 15 Mar – Phase 2 Special Study RFP
- ☐ Jun 15 – Phase 2 Study Authority To Proceed (ATP)
- ☐ Jun 15 – Implementation RFP
- ☐ Jan 16 – Implementation ATP
- ☐ Apr 19 – Ready for Transition to Operations



Summary

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- OCX: Two steps forward, one step back
- Contingency Operations: Full speed ahead